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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,978

06/14/2007

Hiraku Okada

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RADER FISHMAN & GRAUER PLLC
LION BUILDING
1233 20TH STREET N.W., SUITE 501
WASHINGTON, DC 20036

EXAMINER

RIVERO, ALEJANDRO

ART UNIT

PAPER NUMBER

2618

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05/01/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,978	Applicant(s) OKADA ET AL.	
	Examiner ALEJANDRO RIVERO	Art Unit 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/14/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Information Disclosure Statement***

1. The information disclosure statement filed 06/14/2007 fails to comply with 37 CFR 1.98(a)(2) and 37 CFR 1.98(a)(3), because a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; other information or that portion which caused it to be listed, or a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language have not been provided. It has been placed in the application file, but not all of the information referred to therein has not been considered.

2. The listing of references in the specification (page 1 line 27- page 2 line 6) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should

Art Unit: 2618

be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: element 200 of figure 2a. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150

Art Unit: 2618

words. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc. The abstract of the disclosure is objected to because it contains the phrase "The objective of the present invention is" (in line 1). The abstract of the disclosure is also objected to because it is not limited to a single paragraph.

Correction is required. See MPEP § 608.01(b).

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is respectfully suggested by the examiner: MULTIHOP RADIO NETWORK SYSTEM WITH DIVERSITY COMBINING BY AVERAGING OR RELIABILITY-BASED WEIGHT ASSIGNMENT.

7. The disclosure is objected to because of the following informalities:

On page 6 (line 30), the examiner respectfully suggests replacing "serial-to-parallel converted by a serial/parallel" with "parallel-to-serial converted by a parallel/serial", in accordance with figure 6b.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2618

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 2002/0051425 A1) in view of Takeda et al. (US 2003/0051425 A1) and Shattil (US 2003/0147655 A1).

Consider claim 1, Larsson discloses a multihop radio network system (paragraphs [0012], [0028]), through which a signal is transmitted from a source node to a destination node via relay (intermediate) nodes (paragraphs [0028]-[0033]), said multihop radio network system comprising a source node configured

Art Unit: 2618

to modulate and transmit a signal to reach a destination node via a plurality of paths (paragraphs [0028]-[0033], [0050]); said relay nodes configured to relay (paragraphs [0028]-[0033]); and a destination node configured to receive signals transmitted through the plurality of paths by demodulating signals (paragraphs [0014], [0029], [0050]).

Larsson does not disclose regenerating and determining hard-decided values in each path and combining them based on reliability data of each path.

Takeda et al. disclose regenerating (paragraph [0114]).

Shattil discloses determining hard-decided values in each path (paragraphs [0184], [0202]-[0211]) and combining them based on reliability (quality) data of each path (paragraphs [0194]-[0217]).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to regenerate, determine hard-decided values in each path and combine them based on reliability data of each path as taught by Takeda et al. and Shattil in the system of Larsson in order to avoid the hidden terminal problem, increase reliability and maintain system throughput by calculating, at the relay, the required transmission power based on the interference level, and for the purpose of cancelling interference (as suggested by Takeda et al. in paragraphs [0010]-[0011], [0018]-[0023], [0114]-[0118], as suggested by Shattil in paragraphs [0115]-[0118], [0153], [0163], [0184], [0194]-[0224], and as suggested by Larsson in paragraphs [0045]-[0049], [0088]-[0093]).

Consider claim 2, Larsson discloses a receiver system of a multihop radio network system (paragraphs [0012], [0028]-[0033]), through which a signal is transmitted from a source node to a destination node via plurality of paths through relay nodes (paragraphs [0028]-[0033]), said receiver system comprising a demodulator configured to demodulate signals (paragraphs [0014], [0029], [0050]).

Larsson does not disclose regenerating, determining hard-decided values in each path, depacketizing, combining and decoding the combined signal.

Takeda et al. disclose regenerating (paragraph [0114]).

Shattil discloses determining hard-decided values in each path (paragraphs [0184], [0202]-[0211]), depacketizing (demultiplexing), combining and decoding the combined signal (paragraphs [0194]-[0217]).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to regenerate, determine hard-decided values in each path, depacketize, combine and decode the combined signal as taught by Takeda et al. and Shattil in the receiver system of Larsson in order to avoid the hidden terminal problem, increase reliability and maintain system throughput by calculating, at the relay, the required transmission power based on the interference level and for the purpose of cancelling interference (as suggested by Takeda et al. in paragraphs [0010]-[0011], [0018]-[0023], [0114]-[0118], as suggested by Shattil in paragraphs [0115]-[0118], [0153], [0163], [0184], [0194]-[0224], and as suggested by Larsson in paragraphs [0045]-[0049], [0088]-[0093]).

Art Unit: 2618

Consider claim 4, Larsson as modified by Takeda et al. and Shattil disclose all the limitations as applied to claim 2 above and also disclose wherein the combiner is configured to combine by multiplying by a weight (weight vector) based on reliability (quality) data for each of the paths (paragraphs [0194]-[0217] of Shattil as applied to claim 2 above).

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson as modified by Takeda et al. and Shattil and further in view of Raitola et al. (US 6,445,757 B1).

Consider claim 3, Larsson as modified by Takeda et al. and Shattil disclose all the limitations as applied to claim 2 above and also disclose wherein the combiner is configured to combine (paragraphs [0194]-[0217] of Shattil as applied to claim 2 above).

Larsson as modified by Takeda et al. and Shattil do not specify averaging based on the number of paths.

Raitola et al. disclose averaging based on the number of paths (column 6 lines 13-48, figure 5).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to average based on the number of paths as taught by Raitola et al. in the receiver system of Larsson as modified by Takeda et al. and Shattil since the averaging diversity combining method of Raitola et al. allows for an estimate of interference strength (which is particularly useful in multipath systems) without maximum-likelihood (ML) detection, thus saving memory and time usually needed for ML calculations (as suggested by Larsson in paragraphs

Art Unit: 2618

[0037], [0086], as suggested by Takeda et al. in paragraphs [0012]-[0018], as suggested by Shattil in paragraphs [0015]-[0018], and as suggested by Raitola et al. in column 1 lines 46-65, column 2 lines 32-43, column 6 lines 13-48, figure 5).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEJANDRO RIVERO whose telephone number is (571)272-2839. The examiner can normally be reached on Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on 571-272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alejandro Rivero/
Examiner, Art Unit 2618

/Nay A. Maung/
Supervisory Patent Examiner, Art
Unit 2618

